Claims

1. (Cancelled)

2. (Cancelled)

3. (Previously Amended) An apparatus for removing heat from a heat source, the heat source having an area of heat concentration, the apparatus comprising:
a heat sink,
a thermal interface material having a size substantially similar to said area of heat concentration, and
a compressive force placed upon said thermal interface material and between said heat sink and said heat source.

4. (Currently Withdrawn)

5. (Previously Amended) An apparatus as recited in claim 3 wherein said heat source comprises an integrated circuit.

6. (Previously Amended) An apparatus as recited in claim 3 wherein said heat source further comprises a microprocessor having a lid with a surface area larger than a surface area of said microprocessor, said lid interposed between said microprocessor and said thermal interface material.

7. (Previously Amended) An apparatus as recited in claim 3, wherein a spring clip between said heat sink and said heat source applies said compressive force upon said thermal interface material.

8. (Previously Amended) An apparatus comprising:
a heat source having an area of heat concentration,
a heat sink,
a thermal interface material between said heat source and said heat sink covering said area of heat concentration, and
a means for applying a compressive force on said thermal interface material between said heat source and said heat sink.

9. (Cancelled)

10. (Currently Withdrawn)

11. (Previously Amended) An apparatus as recited in claim 8 wherein said thermal interface material is a supported thermal interface material.

12. (Currently Amended) An apparatus as recited in claim 11 wherein said ~~supported~~ thermal interface material comprises Power Devices Co. Powerstrate Foil product.

13. (Cancelled)

14. (Currently Withdrawn)

15. (Original) An apparatus as recited in claim 8 wherein said heat source comprises an integrated circuit.

16. (Original) An apparatus as recited in claim 8 wherein said heat source further comprises a microprocessor having a lid with a surface area larger than a surface area of said microprocessor, said lid interposed between said microprocessor and said displacement element.

17. (Original) An apparatus as recited in claim 8, wherein a spring clip between said heat sink and said heat source

comprises said means for applying said compressive force upon said thermal interface material.

18. (Previously Amended) An apparatus comprising:
an integrated circuit generating heat and having a lid, said lid having a surface area larger than a surface area of said integrated circuit resulting in an area of heat concentration during operation of said integrated circuit,

a heat sink,

a thermal interface material having a surface area sized substantially similar to said area of heat concentration, and

a spring clip placing a compressive force on said thermal interface material between said heat sink and said lid.

19. (Cancelled)

20. (Cancelled)

21. (Previously Amended) An apparatus as recited in claim 18, wherein said thermal interface material is a supported thermal interface material.

22. (Currently Amended) An apparatus as recited in claim 21 wherein said ~~supported~~ thermal interface material comprises Power Devices Co. Powerstrate Foil product.

23. (Currently Withdrawn)

24. (Currently Withdrawn)

25. (Original) An apparatus as recited in claim 18 wherein said integrated circuit comprises a microprocessor.

26. (Previously Amended) A method for mounting a heat sink to a heat source comprising the steps of:

providing a heat source and a heat sink, said heat source having an area of heat concentration,

determining an optimum size for a thermal interface material as a function of said area of heat concentration,

placing said optimally sized interface material between said heat source and said heat sink, and

applying compression to said optimally sized thermal interface material between said heat source and said heat sink.

27. (Cancelled)

28. (Previously Amended) A method for mounting a heat sink to a heat source as recited in claim 26, said step of determining further comprising the steps of establishing values that represent fixed characteristics for said thermal interface material during said step of compressing, establishing constraining equations for an initial size of said thermal interface material, a thickness of said thermal interface material as a function of said compression, and a thermal resistance of said thermal interface material, wherein said step of determining said optimum size for said thermal interface material comprises minimizing said thermal resistance value of said thermal interface material.

29. (Original) A method for mounting a heat sink to a heat source as recited in claim 28, said step of determining an optimum size further comprising providing an eta factor for defining a characteristic for a non-uniform heat source.

30. (Original) A method for mounting a heat sink to a heat source as recited in claim 29 wherein said eta factor

defines a subset of a surface area of said heat source that represents an area of heat concentration.

31. (Cancelled)

32. (Cancelled)

33. (Cancelled)

34. (Cancelled)

35. (Previously Amended) A method of manufacturing an integrated circuit assembly comprising the steps of:

providing a heat sink having a base,

determining a size and position of an area of heat concentration on said integrated circuit,

determining an optimum size for a thermal interface material as a function of said area of heat concentration,

placing said optimally sized thermal interface material_between said integrated circuit and said base, and

applying compression to said optimally sized thermal interface material between said integrated circuit and said base.

36. (Cancelled)

37. (Previously Amended) A method of manufacturing an integrated circuit assembly as recited in claim 35, said step of determining an optimum size further comprising the steps of establishing values that represent fixed characteristics for behavior of said thermal interface material in response to compression, establishing constraining equations for an initial size of said thermal interface material, a thickness of said thermal interface material as a function of said compression, and a thermal resistance of said thermal interface material, wherein said step of determining said optimum size for said thermal interface material comprises minimizing said thermal resistance value of said thermal interface material.

38. (Original) A method of manufacturing an integrated circuit as recited in claim 37 wherein said integrated circuit is a microprocessor encased in a lid.

39. (Original) A method of manufacturing an integrated circuit assembly as recited in claim 35, said step of determining an optimum size further comprising providing an eta factor for defining a characteristic for a non-uniform heat source.

40. (Original) A method of manufacturing an integrated circuit assembly as recited in claim 39 wherein said eta factor defines a subset of a surface area of said heat source the represents an area of heat concentration.

41. (Cancelled)

42. (Cancelled)

43. (Cancelled)

44. (Cancelled)

45. (Original) A method of manufacturing an integrated circuit assembly as recited in claim 35 wherein said integrated circuit is a microprocessor.

46. (Original) A method of manufacturing an integrated circuit assembly as recited in claim 45 wherein said microprocessor is encased in a lid.

47. (Previously Amended) A method of manufacturing a printed circuit board assembly comprising the steps of:

providing an integrated circuit mounted to a printed circuit board, said integrated circuit requiring cooling during operation and having an area of heat concentration,

providing a heat sink for said integrated circuit,

determining an optimum size for a thermal interface material as a function of said area of heat concentration,

placing said optimally sized thermal interface material between said integrated circuit and said heat sink, and

applying compression to said optimally sized thermal interface material between said integrated circuit and said heat sink.

48. (Cancelled)

49. (Previously Amended) A method of manufacturing a printed circuit board assembly as recited in claim 47, said step of determining an optimum size further comprising the steps of establishing values that represent fixed characteristics for behavior of said thermal interface material in response to compression, establishing constraining equations for an initial size of said thermal interface material, a thickness of said thermal interface material as a function of said compression, and

a thermal resistance of said thermal interface material, wherein said step of determining said optimum size for said thermal interface material comprises minimizing said thermal resistance value of said thermal interface material.

50. (Original) A method of manufacturing a printed circuit board assembly as recited in claim 49 wherein said integrated circuit comprises a microprocessor encased in a lid.

51. (Original) A method of manufacturing an integrated circuit assembly as recited in claim 49, said step of determining an optimum size further comprising providing an eta factor for defining a characteristic for a non-uniform heat source.

52. (Original) A method of manufacturing an integrated circuit assembly as recited in claim 51 wherein said eta factor defines a subset of a surface area of said heat source the represents an area of heat concentration.

53. (Cancelled)

54. (Cancelled)

55. (Cancelled)

56. (Cancelled)

57. (Original) A method of manufacturing an integrated circuit assembly as recited in claim 47 wherein said integrated circuit is a microprocessor.